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**U1S S1770**

(56) Documents Cited

**WO 98/06917 A1**

**US 5921698 A**

(58) Field of Search

**UK CL (Edition R) F2H HG HXB, F2M MDX MD9**

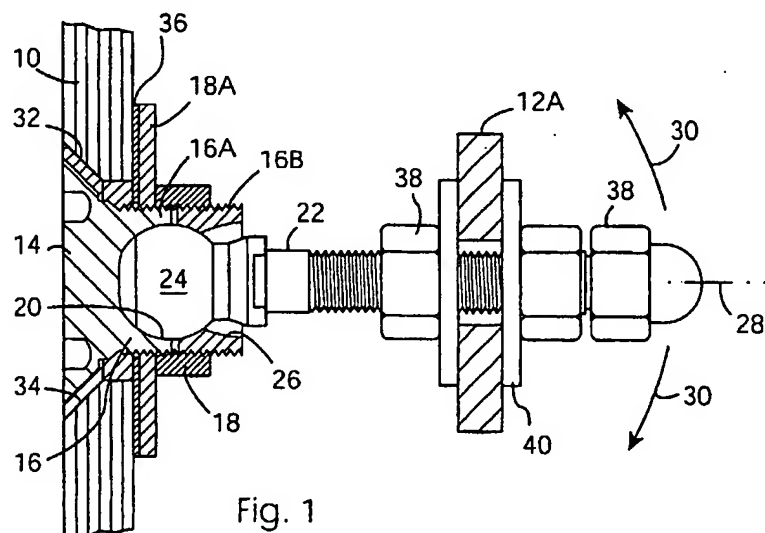
**INT CL<sup>7</sup> E06B 3/54, F16B 5/02 35/04 35/06**

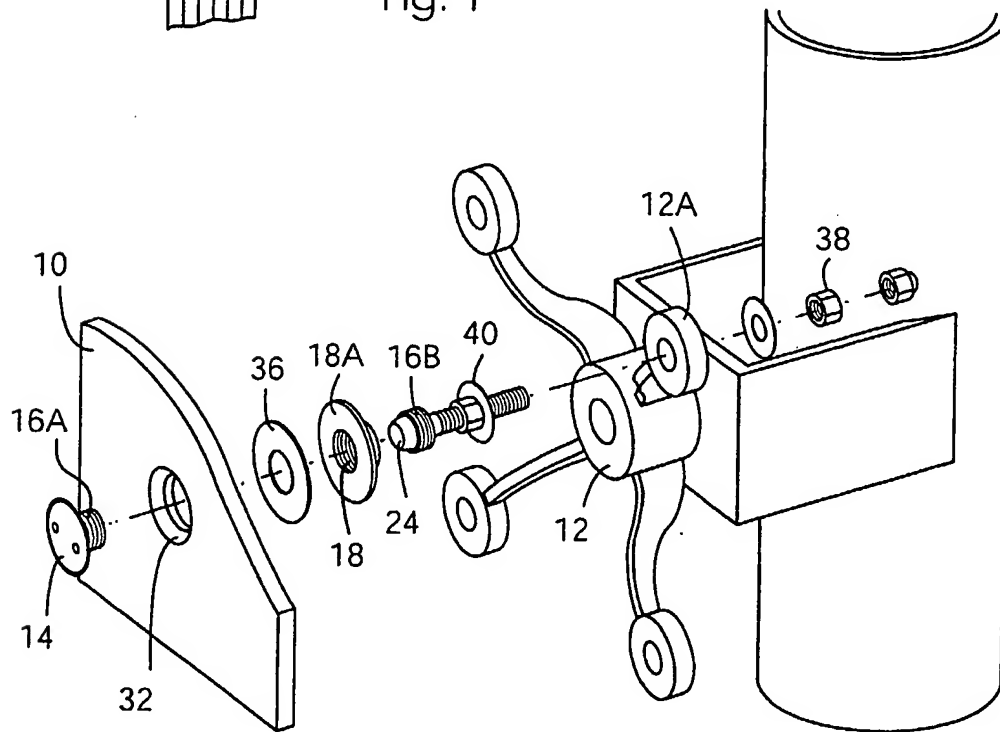
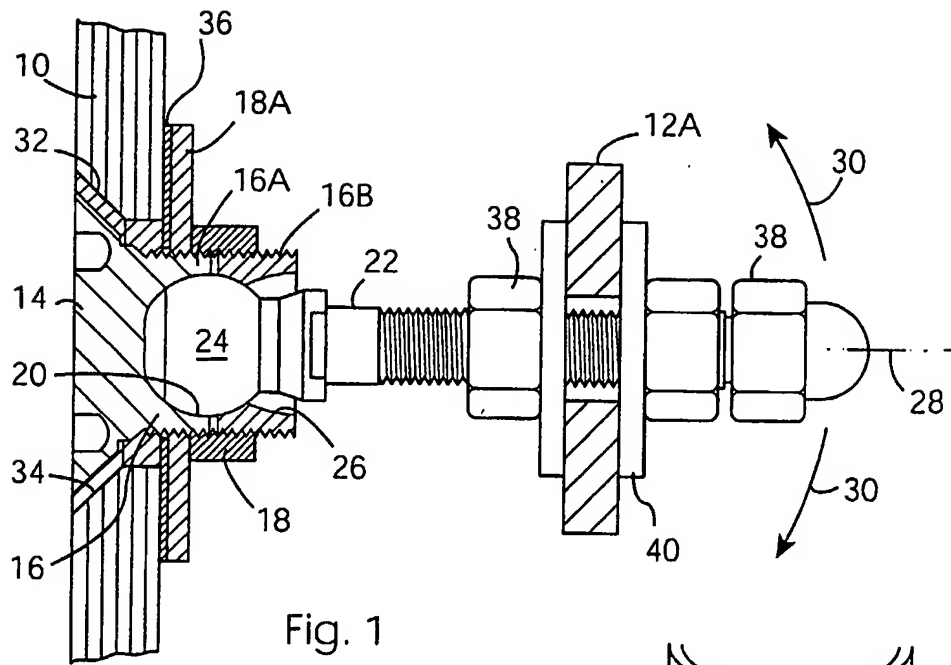
**Online: WPI, EPODOC, JAPIO**

(54) Abstract Title

**Bolts for mounting glass panels**

(57) A bolt for mounting a glass panel (10) to a support member (12A) comprises a head (14) having an externally threaded shank (16) with first and second axially separate parts (16A, 16B). The second part (16B) is releasably secured to the first part (16A) by an internally threaded collar (18) which bridges the first and second parts (16A, 16B). The first and second parts (16A, 16B) of the shank together define a socket (20) an externally threaded shaft (22) has a ball (24) at one end which engages in the socket (20) with the shaft (22) extending through a bore (26) in the second part (16B) of the shank (16).





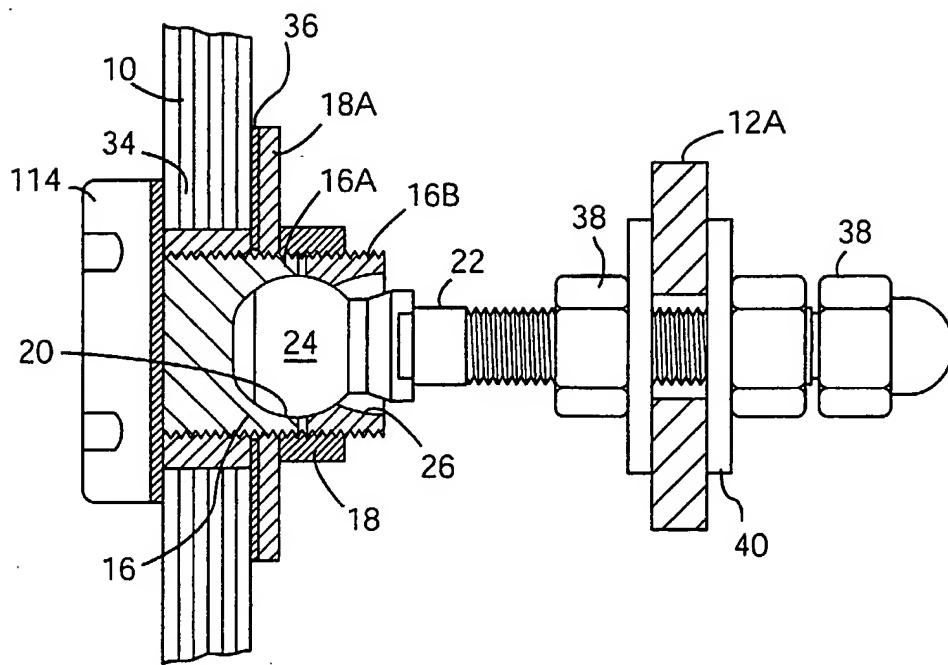


Fig. 3

## MOUNTING BOLT FOR GLASS PANELS

This invention relates to a bolt for mounting a glass or other frangible panel to a support member.

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According to the present invention there is provided a bolt for mounting a glass or other frangible panel to a support member, the bolt comprising a head having an externally threaded shank with two axially separate  
10 parts, the first part of the shank being fixed to the head and the second part of the shank being releasably secured to the rear end of the first part by an internally threaded collar which bridges the two parts, the rear end of the first part and the front end of the  
15 second part together defining a socket of a ball-and-socket joint, the bolt further including an externally threaded shaft having a ball member at its front end which engages in the socket with the shaft extending rearwardly through a bore in the second part of the  
20 shank, the bore being dimensioned to permit limited rotation of the shaft laterally of the shank axis.

In the present context the forward direction is the direction along the axis of the shank from the shank to  
25 the head and the rearward direction is the opposite direction. Terms such as front and rear are to be interpreted accordingly.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

- 5 Fig. 1 is a side view, partly in section, of a bolt according to a first embodiment of the invention;

Fig. 2 is an exploded view illustrating the use of the bolt in mounting a glass panel to a support member; and

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Fig. 3 is a side view, partly in section, of a bolt according to a second embodiment of the invention.

Referring to Figs. 1 and 2, a bolt for mounting a glass  
15 or other frangible panel 10 to a support member such as a support spider 12 comprises a countersunk head 14 having an externally threaded shank 16 with two axially separate parts, a forward part 16A and a rearward part 16B. The forward part 16A of the shank is integral  
20 with the head 14 and the rearward part 16B of the shank is releasably secured to the rear end of the forward part 16A by an internally threaded collar 18 which is screw-threaded onto and bridges the two parts 16A, 16B. The collar 18 has a radial flange 18A. The rear end of  
25 the forward part 16A of the shank and the front end of the rearward part 16B together define a generally spherical socket 20.

The bolt further includes an externally threaded shaft 22 having a ball member 24 at its front end which engages in the socket 20 in the manner of a ball-and-socket joint, the shaft 22 extending rearwardly through a bore 26 in the rearward part 16B of the shank. The bore 26 is dimensioned to permit limited rotation of the shaft 22 laterally of the axis 28 of the shank 16, that is to say within a notional cone centred on the shank axis 28, as indicated by the arrows 30 in Fig. 1.

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In use, the forward part 16A of the shank 16 is inserted into a suitably shaped countersunk aperture 32 in the panel 10, the aperture 32 having previously been lined with a cushioning material 34 such as structural silicone, until the head 14 comes to bear on the silicone 34. Next a PVC washer 36 is placed over the forward part 16A of the shank following which the collar 18 is screwed onto the part 16A until the flange 18A comes to bear, via the washer 36, on the rear surface of the panel 10. Now the head 14 is tightened with a predetermined torque such that the edge of the aperture 32 in the panel is firmly gripped between the flange 18A and the head 14. This may be performed off-site, before the panel 10 is transported to the assembly site.

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At the assembly site the ball member 24 is inserted in the rear end of the forward part 16A of the shank, and then the rearward part 16B of the shank is placed over

the shaft 22 and screwed into the collar 18, as seen in Fig. 1, so that the ball member 24 is trapped in the socket 20 defined by the shank parts 16A and 16B. The part 16B is tightened in the collar 18 sufficiently  
5 that the ball member 24 is not slack in the socket 20 but not so tight that the ball member is locked fast.

Now the shaft 22 extending from the bore 26 may be fixed to a support member by any suitable combination  
10 of nuts 38 and washers 40. In the present embodiment the shaft 22 is fixed to one of four apertured discs 12A on the spider in the manner shown in Fig. 1, but other arrangements are possible depending upon the nature of the support member.

15 Fig. 2 shows the panel 10 being secured at one corner to the spider 12. It will be understood, of course, that the panel 10 will be secured at its other corners, and possibly elsewhere, to other spiders 12 or other  
20 support members using similar bolts to that described. In order to adjust for tolerances the shaft 22 can be rotated slightly laterally of the axis 28 of the shank 16, as indicated by the arrows 30 in Fig. 1.

25 A second embodiment of bolt according to the invention, Fig. 3, uses a surface mounting head 114 instead of a countersunk head, but is otherwise the same as the first embodiment.

The advantage of the invention is that the front end of the bolt (constituting the head 14 or 114 and forward part 16A of the shank) and the collar 18 can be factory installed and torqued onto the glass panel 10. This  
5 allows the panel 10 to arrive on site with the bolt pre-torqued onto the glass. The installer now has only to insert the shaft 22 onto the rear of the pre-torqued bolt. Previous designs used a full, one part bolt which had to be torqued onto the panel on site. This  
10 led to breakages and delays awaiting replacements.

The invention is not limited to the embodiments described herein which may be modified or varied without departing from the scope of the invention.

## CLAIMS

1. A bolt for mounting a glass or other frangible panel to a support member, the bolt comprising a head  
5 having an externally threaded shank with two axially separate parts, the first part of the shank being fixed to the head and the second part of the shank being releasably secured to the rear end of the first part by an internally threaded collar which bridges the two  
10 parts, the rear end of the first part and the front end of the second part together defining a socket of a ball-and-socket joint, the bolt further including an externally threaded shaft having a ball member at its front end which engages in the socket with the shaft  
15 extending rearwardly through a bore in the second part of the shank, the bore being dimensioned to permit limited rotation of the shaft laterally of the shank axis.
- 20 2. A bolt as claimed in claim 1, wherein the collar has a radial flange such that the edge of an aperture in the panel through which the bolt passes may be gripped between the flange and the head.
- 25 3. A bolt substantially as described herein with reference to Fig. 1 or 3 of the accompanying drawings.



**Application No:** GB 0016204.0  
**Claims searched:** 1 - 3

**Examiner:** Peter Macey  
**Date of search:** 5 September 2000

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): F2H (HG, HXB), F2M (MD9, MDX)

Int Cl (Ed.7): E06B 3/54, F16B 5/02, 35/04, 35/06

Other: Online: WPI, EPODOC, JAPIO

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	WO 98/06917 A1 (FAIRCHILD) see figures 3 and 5	-
A	US 5921698 (MERO-RAUMSTRUCKTUR) see figures 1 and 2	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.